

~~CONFIDENTIAL~~

24p

AE61-1166

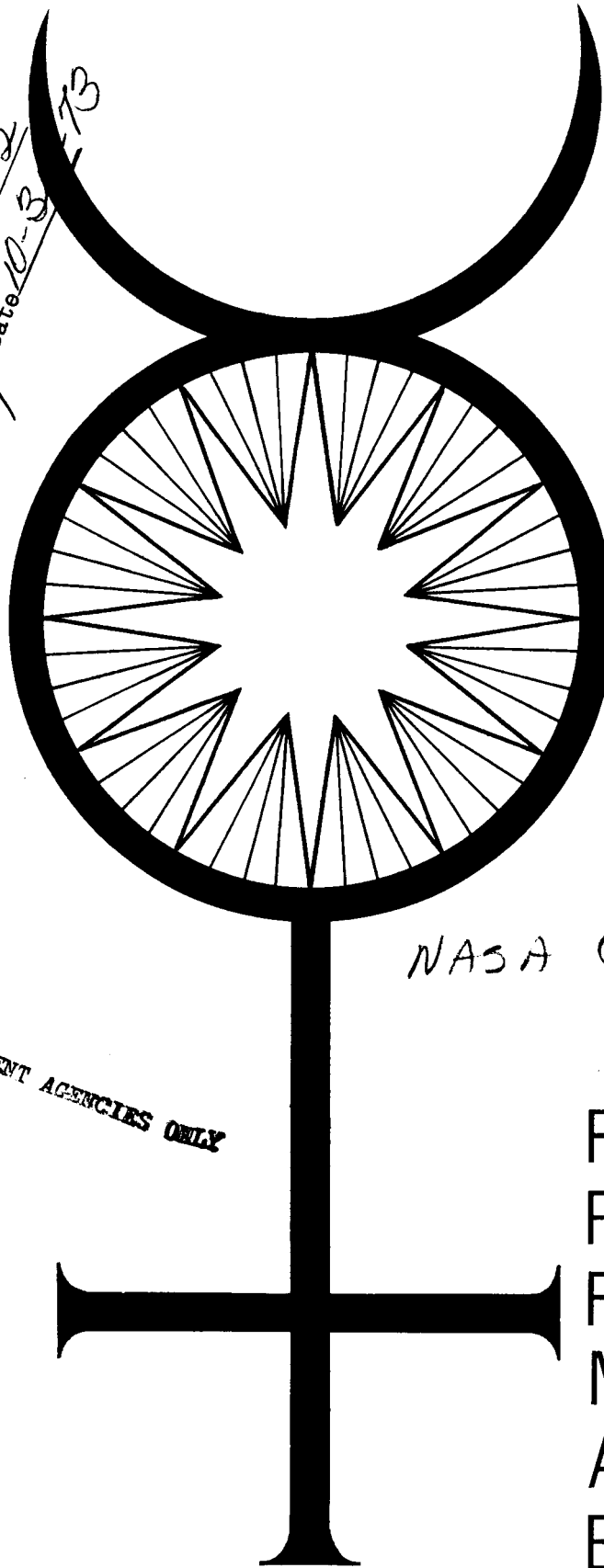
REPORT NO.

GENERAL DYNAMICS | ASTRONAUTICS, A DIVISION OF GENERAL DYNAMICS

TO -
By authority of
Changed by *A. Shirley* Date *10-3-63*
CLASSIFICATION CHANGE
UNCLASSIFIED
E.O. 11652
~~CONFIDENTIAL~~

X 64 10549
code 2c

AVAILABLE TO U.S. GOVERNMENT AGENCIES ONLY



NASA CR 52777

FLIGHT TEST PLAN FOR MERCURY/ ATLAS BOOSTERS

(NASA-CR-52777) ATLAS SPACE BOOSTER
FLIGHT TEST PLAN FOR MERCURY/ATLAS
BOOSTER 1130 (General
Dynamics/Astronautics) 24 p

N73-74992

Unclas
00/99 21504

~~CONFIDENTIAL~~

REPORT NO. AE61-1166
DATE Jan 5, 1962
NO. OF PAGES 25

35,7606f

GENERAL DYNAMICS | ASTRONAUTICS

San Diego, Calif

ATLAS SPACE BOOSTER FLIGHT TEST PLAN
FOR
MERCURY/ATLAS BOOSTER 113D C * *

NASA PROJECT HS-36)

Contract (AF04(647)-768 °)
#

AVAILABLE TO U.S. GOVERNMENT AGENCIES ONLY

PREPARED BY: TEST PLANNING GROUP

ENGINEER: Harry J. Phillips
H. J. Phillips

APPROVED BY: T. L. Maloy
T. L. Maloy

APPROVED BY: H. R. Macdonald
H. R. Macdonald

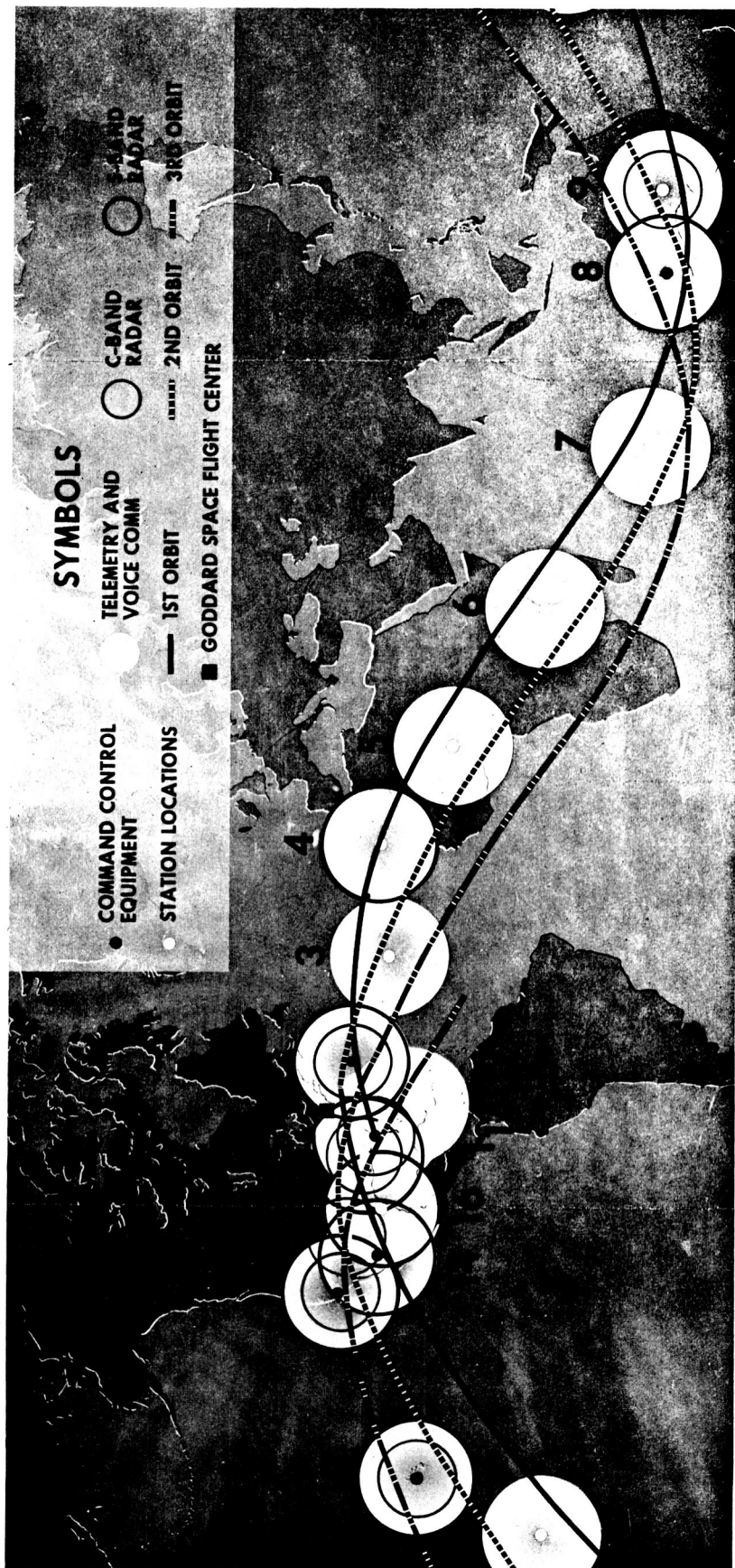
APPROVED BY: P. E. Culbertson
P. E. Culbertson

APPROVED BY: W. F. Miller
W. F. Miller



...Title 18, ...unauthorized person is prohibited by law.

~~CONFIDENTIAL~~



LEGEND

- | | | |
|----------------------------|----------------------------|-----------------------------|
| 1. CAPE CANAVERAL, FLORIDA | 9. WOOMERA, AUSTRALIA | 14. GUAYMAS, MEXICO |
| 1a. GRAND BAHAMA ISLAND | 10. DELETED | 15. WHITE SANDS, NEW MEXICO |
| 1b. GRAND TURK ISLAND | 11. CANTON ISLAND | 16. CORPUS CHRISTI, TEXAS |
| 2. BERMUDA | 12. KAUAI ISLAND, HAWAII | 17. EGLIN, FLORIDA |
| 3. ATLANTIC SHIP | 13. POINT ARGUELLO, CALIF. | |
| | 4. GRAND CANARY ISLAND | |
| | 5. KANO, NIGERIA | |
| | 6. ZANZIBAR | |
| | 7. INDIAN OCEAN SHIP | |
| | 8. MUCHEA, AUSTRALIA | |

ORBITAL PATH AND TRACKING STATIONS

FOREWORD

Report AE61-1166 has been prepared under United States Air Force Contract AF04(647)-768. This report presents the preflight checkout and flight test plan for Mercury/Atlas Booster 113D which will be launched from Complex 14 at the Atlantic Missile Range. This will be the MA-8 mission.

This report has been coordinated with Aerospace Corporation and will support the Detailed Test Objectives for the preparation of the Flight Test Directive.

HS-36 booster associate contractors in addition to GD/A include:

General Electric	- Radio Tracking Guidance System
Burroughs	- Radio Tracking Guidance Ground Computer
Rocketdyne	- Propulsion System

TABLE OF CONTENTS

Foreword	i
Table of Contents	ii
List of Tables and Figures	iii
1.0 Introduction	1
2.0 Flight Test Objectives	3
3.0 Test Program	4
3.1 Flight Test	5
3.2 Flight Test Trajectory Data	5
4.0 Description of Test Article	6
5.0 Test Ground Support Equipment	6
6.0 Instrumentation Requirements	6
7.0 External Data Requirements	6
Appendix A - Definition of Flight Objective Priorities	8
Definition of System Priorities	8
Definition of Code Numbers	9
Definition of Objective Terminology	10
Appendix B - Flight Performance Summary	11
List of References	19
External Distribution List	20

LIST OF TABLES

Table No.	Title	Page
I	Mercury/Atlas Data Status Summary	2
II	Missile Tests	4

LIST OF FIGURES

Figure No.	Title	Page
1	Powered Flight Data	18

1.0 INTRODUCTION

Mercury/Atlas booster 113D has been assigned the mission of injecting a Mercury capsule (No. 16) into orbit. The capsule will contain a man. Approximately 3-1/6 orbits around the earth will be completed by the capsule before landing in the Atlantic Ocean southeast of Florida.

Performance data presented in this report is approximate.

Final performance data will be obtained from reference (m) when it becomes available, approximately March 1962.

Table 1 is enclosed to indicate present status of this Mercury flight as compared to flown and future flights.

CONFIDENTIAL

AE61-1166

Atlas Booster	EID No. 27-0004	Mission No.	Capsule No.	Contract No.	ASIS Loop	Static Firing	Orbital Passes	Pass- engers	Remarks
10D	-1	Big Joe		AFO4(645)-4	open	yes	0	None	Partial success No booster staging
50D	-5	MA-1	4	AFO4(645)-4	open	yes	0	None	Unsuccessful
67D	-6	MA-2	6	AFO4(645)-4	closed	yes	0	Instr.	Successful Flight
100D	-12	MA-3	8	AFO4(645)-4	closed	no	0	Crewman Simulator	Unsuccessful - A/P Programmer Failure.
88D	-10	MA-4	8A	AFO4(645)-4	closed	no	1 1/6	Crewman Simulator	Major Electronic Systems Modifi- cation. Success- ful Flight
93D	-11	MA-5	9	AFO4(645)-4	closed	no	2 1/6	Primate	Successful Flight
109D	-16	MA-6	13	AFO4(645)-4	closed	no	3 1/6	Man	
107D	-14	MA-7	18	AFO4(645)-4	closed	no	3 1/6	Man	
▶ 113D	-18	MA-8	16	AFO4(647)-768	closed	no	3 1/6	Man	
77D	-9	MA-9	19	AFO4(647)-768	closed	no	3 1/6	Man	
130D	-22	MA-10	12	AFO4(647)-768	closed	no	18 1/6	Man	
103D	-13	MA-11	20	AFO4(647)-768	closed	no	18 1/6	Man	
144D	-25	MA-12	17	AFO4(647)-768	closed	no	18 1/6	Man	
152D	-28	MA-13	15	AFO4(647)-768	closed	no	18 1/6	Man	
167D	-73	MA-14	SPARE	AFO4(647)-768	closed	no	18 1/6	Man	

MERCURY/ATLAS DATA STATUS SUMMARY

TABLE 1

CONFIDENTIAL

~~CONFIDENTIAL~~

AE61-1166

2.0 FLIGHT TEST OBJECTIVES

The broad objectives of the MA-8 mission are:

- a. Determine that the capsule life support system will sustain life of the capsule occupant (man) during the launch, orbit, descent and recovery period of the capsule.
- b. Evaluate the effects on the capsule occupant of prolonged exposure to space flight environment.
- c. Demonstrate the adequacy of the world-wide range to acquire, track monitor, and communicate with the capsule.
- d. Exercise ground handling, launch, and recovery procedures.

Definitions of objective terminology and objective code numbers are given in Appendix A.

MERCURY/ATLAS BOOSTER OBJECTIVES

OBJECTIVE CODE	DESCRIPTION	PRIORITY
MD22	Obtain data on Atlas systems for gross Systems Analysis.	2
MD24	Demonstrate the ability of the Atlas to release the capsule at the predetermined position and velocity in space as defined by the guidance equations.	1
MD29	Evaluate the performance of the 'abort sensing and implementation system' (ASIS) when operating closed loop.	1
MD31	Determine the magnitude of the sustainer/vernier residual thrust after cutoff.	3

MERCURY CAPSULE OBJECTIVES

- a. Evaluate performance of a man-spacecraft system in a 3 orbit mission.
- b. Evaluate effects of space flight on the Astronaut.
- c. Obtain Astronaut's opinions on the operational suitability on the capsule and supporting systems for manned space flight.

~~CONFIDENTIAL~~

3.0 TEST PROGRAM

Major pre-flight inspections and tests to be performed on Mercury/Atlas Booster 113D at AMR are listed in the table below. The GD/A published Flight Test Directive (FTD) details the tests.

Test Events	Purpose	Summary
Missile Receiving and Inspection (Hangar Area)	Missile Integrity	Pods, tank section, thrust section inspected for damage, rust and/or corrosion. Missile completeness checked against applicable documents. Trailer servicing and missile weighing.
Compatibility Test	Verifies the mechanical compatibility of the capsule - capsule adapter & Mercury/Atlas booster.	Verification of capsule - capsule adapter mechanical fit, umbilical lengths, clearance, capsule umbilical separation operation, and capsule landline circuits.
Systems Tests (Complex Area)	System performance & determination of operational readiness.	Azusa, Telemetry, RSC, Electrical & Guidance Systems, Flight Control Auto-pilot Frequency Response, GD/A PU, ASIS are checked per applicable GD/A procedures.
Flight Acceptance Composite Test (FACT)	Integrated check of all Mercury/Atlas systems & capsule systems prior to flight.	An integrated check of missile systems, launch complex, GMCF #1 and applicable range stations is accomplished. Proper operation of 1) all missile systems on internal missile power, 2) circuits involving pyrotechnics, 3) engine firing circuits and 4) umbilical ejection is evaluated. All missile & capsule r-f systems are radiating simultaneously for evaluation of interaction effects.

MISSILE TESTS

~~CONFIDENTIAL~~

AE61-1166

3.1 FLIGHT TEST

The missiles will be launched from Complex 14 at the Atlantic Missile Range (AMR) at a nominal azimuth of 72.51° T. Nominal impact of the capsule with a man aboard will occur in the Atlantic Ocean, southeast of Florida and Northeast of the Dominican Republic after completing approximately 3-1/6 orbits around the earth. The Atlas sustainer/vernier booster vehicle will also go into orbit. No retrorocket provision for descent from orbit are aboard the Atlas consequently, its ultimate termination status is not predicted.

A holddown time delay of 3.00 seconds from the time of "main engines complete" until the time of "pre-release cutoff disarm" signal will be incorporated in order that rough combustion characteristics, if present, will terminate the launch prior to lift-off.

The ASIS will be installed on the missile in a closed loop configuration. If any of the sensors in the circuit reach a pre-set value after the circuit is armed at 2 inch motion, loss of the 28 volt signal to the capsule will occur and capsule abort will be initiated. A three (3) second delay timer has been incorporated in the range safety command between engine cut-off and destruct enable to permit safe separation of the capsule from the missile in the event the missile is destroyed by Range Safety.

Typical trajectory parameters are as follows:

EVENT	VELOCITY FT/SEC.	ALTITUDE N. M.	RANGE N. M.	TIME SEC.
Staging (booster)	9,150	33.8	45.0	130.76
Sustainer & Vernier Cutoff	25,696	87.0	430.5	301.54
Capsule Impact	(Information pertinent to descent for recovery not available at time of publication-to be be furnished at later date.)			

3.2 FLIGHT TEST TRAJECTORY DATA

The flight trajectory for the Atlas boost phase of the operation is illustrated in Figure 1 and is based on preliminary calculations.

~~CONFIDENTIAL~~

4.0 DESCRIPTION OF TEST ARTICLE

Mercury/Atlas booster 113D is an SM-65D vehicle fabricated for the Mercury project in accordance with Reference (f). The systems installed are identical with that described for 107D (Reference e). Atlas 113D's telemetry system will consist solely of one lightweight telemetry package.

A detailed description of the Mercury capsule may be found in Ref. (h).

5.0 TEST SUPPORTING EQUIPMENT AND/OR FACILITIES

The test ground support equipment such as missile handling, launching instrumentation, data recording equipment, etc., required to conduct a series D Flight Test Program at AMR is outlined in Reference (i). Additional modifications to accommodate Project Mercury are listed in Reference (g). Test ground support equipment for the ASIS equipment is covered in Reference (j).

6.0 INSTRUMENTATION REQUIREMENTS

Complete instrumentation is listed in References (k) and (l).

7.0 EXTERNAL DATA REQUIREMENTS

The type, range, sampling rates, desired accuracy, method of acquisition and presentation, and subsequent distribution of data required of AMR are outlined in Reference (g).

APPENDIX A

Definition of Flight Objective Priorities

Definition of System Priorities

Definition of Code Numbers

Definition of Objective Terminology

Definition of Test Objective Priorities

First Order Objectives ("1") - The mandatory reasons for the flight of the test vehicle. The inability to accomplish first order objectives will seriously delay the timely advancement of the program. Malfunctions of equipment or instrumentation which jeopardize the accomplishment of first order objectives will be cause to hold or abort the flight until such time as a fix is made.

Second Order Objectives ("2") - Those required to determine the overall performance of the test vehicle or the operation of specified systems. The inability to accomplish second order objectives may delay, but not necessarily compromise, the timely advancement of the program. Malfunctions of equipment or instrumentation which jeopardize the accomplishment of second order objectives will be cause to hold the flight only at the discretion of the test controller and/or the test director. The decision to hold will be based upon whether or not the accomplishment of the first order objectives is placed in jeopardy by holding and upon the operational circumstances which exist at the time the malfunction occurs.

Third Order Objectives ("3") - Those desired to furnish supplementary data for the overall vehicle evaluation, for support of future flights, or for special non-weapon systems investigations. The inability to accomplish third order objectives will not significantly delay the timely advancement of the weapon system program but may limit the level of comprehension of the performance of the overall vehicle or the non-weapon systems. Malfunctions of equipment or instrumentation which jeopardize the accomplishment of third order objectives will not require a hold after the start of pre-countdown. Correction thereafter may be made on a non-interference basis at the discretion of the test controller and/or the test director.

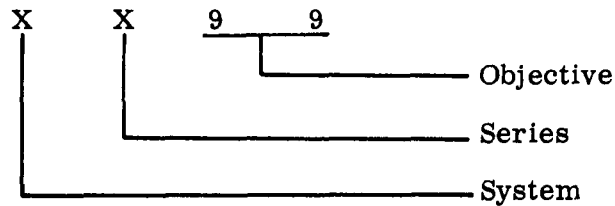
Definitions of System Priorities

Primary Systems ("P") - Those functionally required to launch and maintain the vehicle in planned flight. These systems include test ground support equipment needed to accomplish the launch operation. A flight hold or abort will be mandatory if any of these systems indicate improper performance up to the time of release. Positive indication of satisfactory performance must be available.

Secondary Systems ("S") - Those not functionally required to launch or maintain the vehicle in planned flight. Malfunction of any of these systems will cause flight hold or abort as dictated by the order of the test objectives which they support.

Definition of Objective Code Numbers

Each flight test objective in this report has been assigned a code number. The first code letter identifies the system for which the objective is written and the second letter identifies it as a Series D objective.



The following designations are used:

- A Airframe
- C Accessory Power Supply
- D Range Safety Command
- E Electrical System
- F Pneumatic System
- G. Guidance System
- H Hydraulic System
- L Launch and Ground Support
- M Miscellaneous
- N Facility and Site
- O Overall General Objectives, i. e. , Repeatability, Compatibility
- P Propulsion System
- S Flight Control System
- T Telemetry System
- U Propellant Utilization System
- Y Re-Entry Vehicle
- Z Azusa Transponder

DEFINITIONS OF OBJECTIVE TERMINOLOGY

The definition of terms used in connection with objectives for this report are given below:

DEMONSTRATE - denotes the occurrence of an action or an event during a test. The accomplishment of this type objective requires a qualitative answer. The answer will be derived through the relation of this action or event to some other known information or occurrence. This category of objective implies a minimum of airborne instrumentation, and/or that the information be obtained external to the missile.

DETERMINE - denotes the measuring of performance of any unit or system. This category implies the quantitative investigation of over-all operation which includes, generally, instrumentation for measuring basic inputs and outputs of the unit or system. The information obtained should indicate to what extent the system is operating as designed. The instrumentation should allow performance deficiencies to be isolated to either the system or to the system inputs.

EVALUATE - denotes the measuring of performance of any unit or system as well as the performance and/or interaction of its sections or subsystems that are under investigation.

The accomplishment of objectives of this type requires quantitative data on the performance of both the unit or system and its sections or sub-systems. Instrumentation for this category generally includes measuring basic inputs and outputs of the unit of system as well as basic inputs and outputs of its sections or sub-systems. The performance levels of the sections or sub-systems will then be analyzed for their contribution toward performance of the unit or system. This category will provide the most detailed information of any of these categories.

OBTAIN DATA - denotes gathering engineering information which is to be measured to augment the general knowledge required in the development of the over-all weapon system. This category may also be used for supplemental investigations such as environmental studies, ascertaining k factors, ground equipment studies, etc. The degree of instrumentation is not implied by this definition: individual objectives will indicate extent of instrumentation required.

ESTABLISH - denotes gathering engineering information for the development of ground procedures and operating techniques. Objectives in this category are not necessarily dependent on analytic studies.

AE61-1166

APPENDIX B

Flight Performance Summary

~~CONFIDENTIAL~~

AE61-1166

FLIGHT PERFORMANCE SUMMARY

LAUNCH

Weight	260,110 lbs.
Booster Engine Thrust @ S. L.	308,529 lbs.
Sustainer Engine Thrust @ S. L.	56,729 lbs.
Vernier Engine Thrust @ S. L.	1,700 lbs.
Axial Lift-Off Thrust @ S. L.	366,958 lbs.
Initial Thrust to Weight Ratio	1.41
Booster Propellant Flow @ Lift-Off	1,230 lbs/sec.
Sustainer Propellant Flow @ Lift-Off	264 lbs/sec.
Vernier Propellant Flow @ Lift-Off	10 lbs/sec.
Launch Azimuth	72.51 deg.

BOOSTER CUTOFF

Time	130.76 sec.
Weight (includes escape tower)	63,926 lbs.
Velocity (Terrestrial)	9,150 ft/sec.
Altitude	207,405 ft.
Flight Path Angle (Local)	25.66 deg.
Thrust to Weight Ratio	6.89
Range	45.0 NM
Sustainer Propellant Flow (Second Stage)	255.1 lbs/sec.
Vernier Propellant Flow (Second Stage)	9.8 lbs/sec.

SUSTAINER & VERNIER CUTOFF

Time	301.54 sec.
Weight (Minimum)	10,294 lbs.
Velocity (Inertial)	25,696 ft/sec.
Altitude	87 NM
Flight Path Angle	0.004 deg.
Thrust to Weight Ratio	7.86
Range	430.5 NM

CAPSULE RE-ENTRY & IMPACT SUMMARY INFORMATION TO BE FURNISHED AT A
LATER DATE WHEN AVAILABLE.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~
~~CONFIDENTIAL~~

AE61-1166

ATLAS A/P GUIDANCE SEQUENCE OF EVENTS

EVENT	TIME-SEC (Nominal)
Launch release sequence initiated	
Flight programmer timing cycle activated at 2" of missile vertical motion.	
ASIS System to automatic activated at 2" of missile vertical motion.	
Equipment pod umbilicals ejected and hold-down arms retracted at 7" of missile vertical motion.	
Autopilot activated at 42" of missile vertical motion.	
Sustainer thrust chamber nulled in P/Y. (PITCH/YAW)	
Vernier thrust chambers activated in R (30° cant).	
Booster thrust chambers activated in P/Y/R. (PITCH/YAW/ROLL)	
Enable Roll Program	LAU + 2
High Roll Gyro Excitation	LAU + 2
Disable Roll Program	LAU + 15
Start Pitch Program	LAU + 15
Low Roll Gyro Excitation	LAU + 15
Enable ASIS Engine Cutoff	LAU + 30
Reduce P/Y Position Gain	LAU + 85
Change P/Y Filter from 8+4 cps to 3+4	LAU + 85
Enable Staging Discrete	LAU + 120
Guidance Discrete-Staging Command (STG)	LAU + 131.4
Staging Backup	LAU + 136
Booster Cutoff (BECO)	STG + 0.1
Booster Zero	STG + 0.1

~~CONFIDENTIAL~~
~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

AE61-1166

EVENT	TIME-SEC (Nominal)
Rate Gain Increase P/Y	STG + 0.1
Activate Sustainer in P/Y	STG + 0.1
Activate Verniers in P/Y	STG + 0.1
Null Filters P/Y	STG + 0.1
Filter Gain Change P/Y	STG + 0.1
Increase P/Y Position Gain	STG + 0.1
Change P/Y Filter from 3+4 cps to 8+4	STG + 0.1
STG Rage Ratio Change to ASIS	STG + 0.1
End Pitch Program	STG + 0.1
Zero Sustainer	STG + 3.0
Booster Jettison	STG + 3.1
Activate Sustainer in P/Y	STG + 3.7
Enable Guidance in P/Y	STG + 5.0
Start Sustainer Stage Pitch Program	STG + 5.0
Disable Verniers in P/Y	STG + 6.7
Bias Verniers to 50° Yaw	STG + 6.7
Un-Null Filter P/Y	STG + 10
End Sustainer Stage Pitch Program	STG + 24.0
Signal Rate Ratio Change to ASIS	STG + 30

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

AE61-1166

EVENT	TIME-SEC (Nominal)
Enable SECO, VECO	STG + 80
Guidance Discrete-Sustainer Cutoff Command (SECO)	STG + 170.1
Sustainer Cutoff	SECO + 0
Disable ASIS	SECO + 0
Activate Verniers in P/Y	SECO + 0
Null Filters P/Y	SECO + 0
Vernier Cutoff	SECO + 0
Reset Programmer	STG + 210

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

AE61-1166

LAUNCH WEIGHT ESTIMATES POUNDS
GROSS TANKING TO VERNIER CUT-OFF

TOTAL WEIGHT AT GROSS TANKING		267,743
LO ₂ Vent System Loss (2.25 min)	550	
ENGINE START OR SUSTAINER LOCK-IN		267,193
Ground Expended (5.0 Sec. Nom.)	6,714	
LO ₂ Expended	4,606	
Fuel Expended	1,782	
Lube Oil Expended	6	
Exterior Frost	50	
LN ₂ Dumped	270	
LIFT-OFF (2 inch motion)		260,479
LO ₂ Expendables (main impulse)**	168,714	
Fuel Expendables (main impulse)**	73,776	
Vernier Solo Expendables	0	
LO ₂	0	
GO ₂ Boil-Off	0	
Fuel	0	
Other Expendables	309	
GO ₂ Loss thru Vernier Vent	103	
Lube Oil	206	
Booster Jettisoned	7,101	
Booster Dry W/Growth Allowance (10)	5,986	
LO ₂ Trapped	562	
Fuel Trapped	496	
Helium in Booster Bottles	53	
Lube Oil	4	
Other Jettisoned Mercury Tower	1,078	
VERNIER CUT-OFF WEIGHT (Minimum)		9,501
Mercury Capsule		2,930
Growth Allowance		40
Sustainer Dry W/Adapter (183)		5,330
Growth Allowance		40
Residual Propellants		333
LO ₂	99	
NPSH Above Station 1142	0	
Pump to Station 1142	0	

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

AE61-1166

	Trapped at Center Bulkhead	30	
	Below Sustainer Pump	21	
	Vernier System	48	
Fuel			234
	Pump to Anti-Vortex Web	64	
	Trapped in Outlet	78	
	Below Sustainer Pump	23	
	Vernier System	69	
Other Residuals			318
	Helium in LO ₂ Tank		29
	Helium in Fuel Tank		45
	Helium in Sustainer Bottles		4
	Nitrogen in Fuel Tank		0
	GO ₂ in LO ₂ Tank		234
	Lube Oil (Minimum)		6

PROPELLANT DATA

LO₂

FUEL

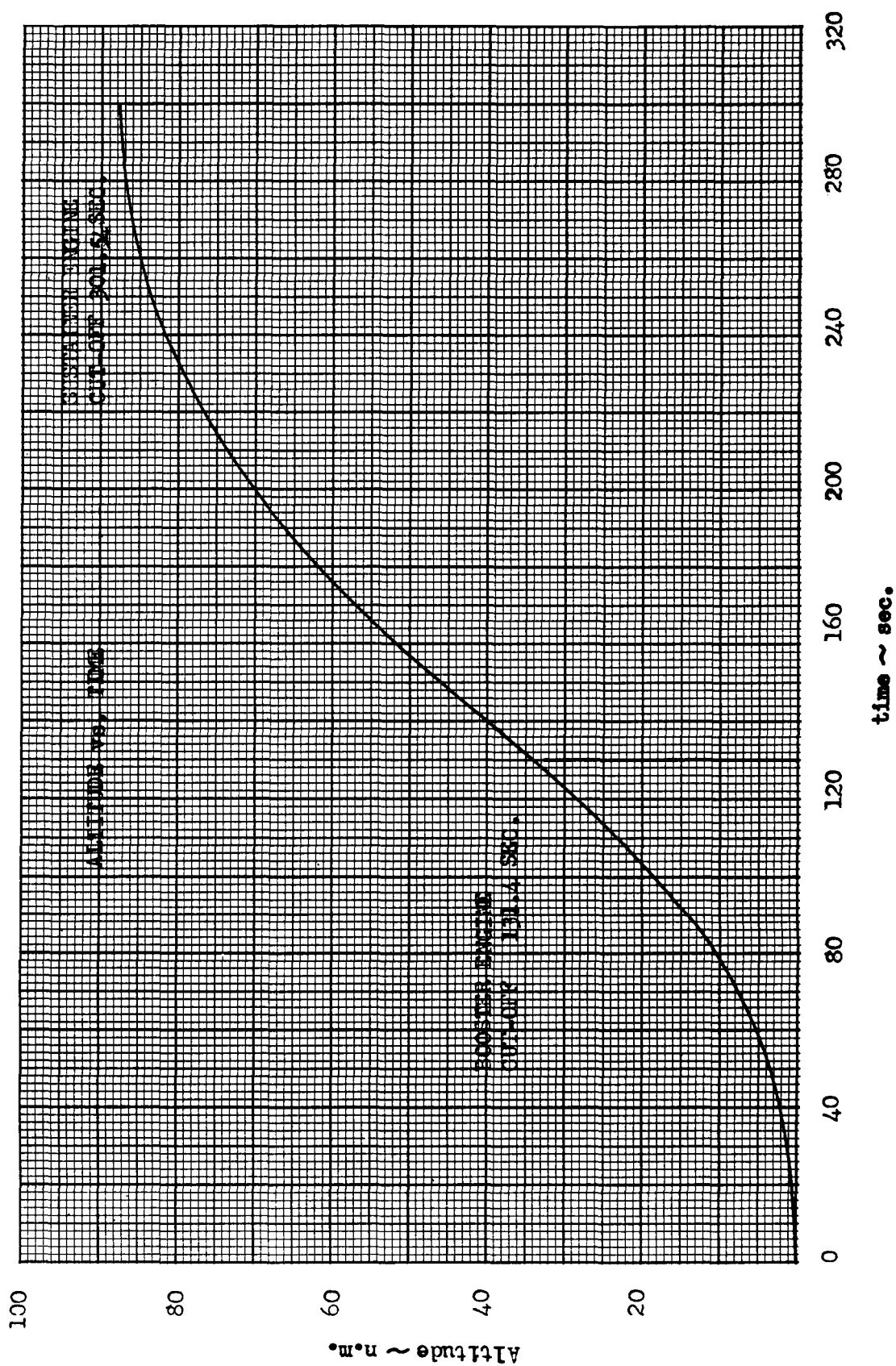
<u>CONDITION</u>	<u>WEIGHT</u>	<u>DENSITY</u>	<u>WEIGHT</u>	<u>DENSITY</u>
Tanking	174,850	70.39 lbs/cu ft	76,288	50.11 lbs/cu ft
Ignition	174,300	70.33 lbs/cu ft	76,288	50.11 lbs/cu ft

** DOES NOT INCLUDE VERNIER STAGE EXPENDABLES

~~CONFIDENTIAL~~

AE61-1166

Figure 1



LIST OF REFERENCES

- a. GD/A report AZC-27-075A, "Flight Test Plan, Mercury/Atlas Booster 100D"
- b. GD/A report AE60-0782A, "Flight Test Plan, Mercury/Atlas Booster 88D"
- c. GD/A report AE60-0783, "Flight Test Plan, Mercury/Atlas Booster 93D"
- d. GD/A report AE61-0466, "Flight Test Plan, Mercury/Atlas Booster 109D"
- e. GD/A report AE61-0891, "Flight Test Plan, Mercury/Atlas Booster 107D"
- f. GD/A report AZC-27-026, "Model Specifications for Atlas/Mercury (HS-36) Booster USAF Model SM-65D (Modified) Convair Model 27".
- g. GD/A report AZC-27-063A, "Flight Test Program for Mercury/Atlas Boosters"
- h. McDonnell Aircraft Corp. report SEDR 104, "Project Mercury Familiarization Manual, NASA Manned Satellite Capsule", date 1 Feb. 1961.
- i. GD/A report ZM-7-112, "Test Ground Support Equipment List, XSM-65 Series"
- j. GD/A report AZM-27-321, "Test Equipment Program for the Abort Sensing and Implementation System for Mercury/Atlas Flights", dated 17 July 1959
- k. GD/A report AZC-27-066, "Instrumentation Configuration, Mercury Summary at AMR"
- l. GD/A report AZC-27-066-113, "Instrumentation Configuration, Series D, Article 113, AMR"
- m. GD/A report "Range Safety and Dispersion Information for SM-65D-113" (not available at this time).

EXTERNAL DISTRIBUTION LIST

AFSSD, attn: TDC	1
AEROSPACE CORP.	11
6555TH TEST WING (AMR)	1
AFPR	1
 Burroughs Corporation	 2
Paoli, Pa.	
 General Electric Company	 2
Syracuse, New York	
 General Electric Company	 2
San Diego Field Operations	
 Rocketdyne, Canoga Park, Calif.	 2
 <u>NASA Distribution</u>	
Col. Asa B. Gibbs, Director of NASA	1
MTQD Test Support Office	
 NASA - Project Mercury, MTWMA	 2
Patrick AFB, Attn: B. Porter Brown	
 Mercury Systems Consultant	 1
c/o McDonnell Aircraft Corp.	
Box 6101 Lambert Field, Missouri	
Attn: Mr. Scott H. Simpkinson	
 Space Task Group,	 5
Langley Research Center, Langley Field, Va.	
Attn: R. R. Gilruth	